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ABSTRACT

An evaluation was made of the effectiveness of an empirically derived five-item questionnaire, the Teacher's School Readiness Inventory (TSRI), in identifying at-risk or failure-prone preschool children. Screened with the TSRI in the spring of either the prekindergarten or kindergarten year, four samples totalling 453 children were followed through the end of first grade. Results showed that scores on the TSRI produced an average correlation of .58 with the children's performance across the first grade curriculum. The cutoff points on the inventory achieved an overall hit rate of 86 percent, and correctly identified 73 to 90 percent of those preschool children whose subsequent work in first grade placed them at or near the bottom of the class. (References, a TSRI individual rating form, and three tables are appended.) (Author/RH)

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An Evaluation of a New Teacher Inventory to Identify the Failure-prone Preschool Child

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Abstract

This investigation was undertaken to evaluate the effectiveness of the Teacher's School Readiness Inventory (TSRI), an empirically derived five-item questionnaire, in identifying at-risk or failure-prone preschool children. Four samples totalling 453 children, screened with the TSRI in the spring of either pre-kindergarten or kindergarten, were followed through the end of first grade. The evidence showed, first, that scores on the TSRI produced an average correlation of .58 with the children's performance across the first grade curriculum and, second, that the cutoff points on this inventory correctly identified 73% to 90% of those preschool children whose subsequent work in first grade placed them at or near the bottom of the class while achieving an overall hit rate of 86%.

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An Evaluation of a New Teacher Inventory to Identify the Failure-prone Preschool Child

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Since the 1970s there has been considerable interest throughout North America in establishing compensatory education programs to assist preschool children who are at risk for early school failure (Casto & Mastropieri, 1986; Lazar & Darlington, 1982; Wright, 1983). Because of budget restrictions, however, today it is often the pre-kindergarten or kindergarten teacher, instead of the psychologist or psychometrist, who must identify and then refer for placement, children who might profit from being in such programs (Lichtenstein & Ireton, 1984; Lindsay, 1980; Lindsay & Wedell, 1982). This important role in screening that teachers now play is typically performed in the spring semester to allow ample time for teachers to become familiar with the children in their classes. Unfortunately, however, findings reported by Fletcher and Satz (1984) as well as Stevenson, Parker, Wilkinson, Hegion, and Fish (1976) suggest that even though teachers have an opportunity to become well acquainted with the children's day to day behaviors prior to screening, a teacher's global judgement of a preschool child's learning potential might not be very accurate. In both investigations

evidence was reported showing that only about 20% of those children who subsequently experienced considerable difficulty learning were correctly identified by their preschool teachers in the spring semester as children in need of special assistance. In at least one sense though these findings come as no surprise since work by Becker and Snider (1979) as well as Keogh, Tchir, and Windeguth-Behn (1974) suggests that preschool teachers often are uncertain when asked to list the characteristics that best describe the child with a possible learning handicap.

To be sure, inventories or behavior checklists designed to help preschool teachers improve the accuracy of their judgements in identifying at-risk children have been available for many years (for examples see Crow, 1978; Nurss & McGauvran, 1976; Valett, 1974; Wallace & Larsen, 1978; Zeitlin, 1976). Most of these inventories, however, suffer from two major shortcomings that could seriously hamper their usefulness in any screening program. First, the vast majority contain anywhere from 40 to over 200 items that a teacher must complete in order to judge the academic potential of a given child. Hence, a teacher who decides to employ one of these devices could easily require a week or longer to screen a typical class of 25 children--time that most teachers simply cannot spare for this purpose even though they might be very aware of the importance of making correct referral decisions. Second, and of far greater concern, it is well known that many of these inventories have never been

properly validated (Levy & Goldstein, 1984; Lindsay, 1980). In fact, in a recent review we reported that a large number of items frequently found on these inventores have little or no bearing on later school performance (Simner, 1983). For instance, items that require a teacher to determine whether a preschool child knows the names of the body parts and their positions, knows left from right, or can walk a balance beam usually only produce correlations of around .20 with later school performance, correlations that simply are too low to be of any practical importance. Thus, if teachers draw upon items like these when deciding whether or not to refer a child, their decisions might very well be based on faulty information.

During the course of preparing this review, however, we were able to locate five items which, when scored in the spring, normally produce correlations in the neighborhood of .50 with early school achievement (see Table 2 in Simner, 1983). To help rectify the shortcomings mentioned above we then proposed that if preschool teachers only refer children who perform poorly on an inventory composed of these items, they could have a reasonably accurate and at the same time, an extremely rapid means for identifying the at-risk children in their classes. To examine this proposal we then developed the Teacher's School Readiness Inventory (TSRI), shown in Figure 1, which is composed of these five items and the scoring instructions given in Simner (1983). Hence, the major aim of the present longitudinal investigation

was to evaluate the effectiveness of this new inventory in identifying children screened in the spring of pre-kindergarten and kindergarten who subsequently experienced difficulty mastering the first grade curriculum.

Place Figure 1 about here

Procedure

Subjects

To insure replicability we employed two independent samples of children at both the pre-kindergarten (N = 113) and kindergarten (N = 340) levels. All four samples were drawn from 22 public elementary schools serving lower and middle income areas of London, Ontario, an urban center with a population of 275,000. The children were obtained by distributing permission forms through the schools requesting parental approval to collect information on the children's behaviors in preschool and on the children's subsequent academic achievment. Approximately 70% of the permission forms were returned and, with few exceptions, all of these gave approval for the children to take part in this investigation.

Telephone interviews were conducted with a representative group of 103 parents for the purpose of collecting demographic information. The outcome of these interviews indicated that the

mean socio-economic index for the samples was 37.8 on the Blishen scale for Canadian occupations (Blishen & McRoberts, 1976). In addition, according to the children's teachers, whereas about 10% of the children came from a bilingual background, all were fluent in English and all were in an age-appropriate grade (either pre-kindergarten or kindergarten) at the time the ratings were made.

Sample #1 consisted of 45 pre-kindergarten children (26 male, 19 female) distributed among four classes and rated in March, 1983. Sample #2 contained 68 pre-kindergarten children (39 male, 29 female) divided among seven classes and rated in March, 1984. Sample #3 was composed of 107 kindergarten children (52 male, 55 female) from seven classes. The ratings on these children were obtained in March, 1983. Finally, Sample #4 involved 233 children (118 male, 115 female) divided among 15 classes and assigned ratings in March, 1984. The mean age of the pre-kindergarten children when rated was 4 years, 8 months while the mean age of the kindergarten children was 5 years, 9 months. Furthermore, all of the children were in attendance in the classes in which the ratings took place for periods ranging from two to six months prior to being rated by their teachers.

Method

The children's teachers were asked to rate each child on all five items on the TSRI according to the instructions shown in Figure 1. A total or composite score that ranged from 5 through 25 for each child was then obtained by adding each of the separate ratings. The mean composite score for the pre-kindergarten children (Sample #1 and #2 combined) was 15.4 (SD = 4.6) whereas for the kindergarten children (Sample #3 and #4 combined) the mean composite score was 17.0 (SD = 4.5).

Inter-rater reliability

The most appropriate way to evaluate the inter-rater reliability of an instrument like the TSRI is to obtain independent ratings made at the same time of year by different teachers who are equally familiar with the children being rated. Unfortunately, few classes from which the children in our investigation were drawn had a teaching assistant who knew the children as well as the children's own teacher. This situation, of course, is common to all investigations of teacher inventories and, perhaps, is the reason why most other inventories contain no evidence on inter-rater reliability.

However, we were able to obtain two ratings on children attending eight of the classes. Each rating was made by the child's teacher and a teaching assistant who was equally familiar

with the child. To guard against the possiblity of bias, each rater was requested not to discuss her ratings with the other rater. When the TSRI forms were collected the raters were asked if they had complied with these instructions. Because one pair of raters failed to comply, the forms they submitted were excluded from the analysis. The final sample consisted of two ratings on 113 children obtained from seven pairs of raters.

The results yeilded a product-moment correlation of .86 (df = 111, p <.001) between the pairs of total scores obtained from the two groups of raters. It is worth noting that the level of agreement indicated by this correlation is similar to that reported in the few studies dealing with teacher inventories where others also were able to gather information on inter-rater reliability (Feshback, Adelman, & Fuller, 1974; Lindsay, 1980; Novack, Bonaventura, & Merenda, 1973).

Achievement Criteria

The children in all four samples were followed through the end of first grade. Hence, the pre-kindergarten children in Sample #1 and #2 were tracked for a period of two years while the kindergarten children in Sample #3 and #4 were tracked for a period of one year.

Two different criteria were employed in evaluating the children's academic performance. The first and major

criterion was chosen to comply with many recent suggestions calling for the use of meaningful or realistic measures that reflect actual classroom work when evaluating research that is supposed to relate to school achievement (e.g., Lazar & Darlington, 1982). At the end of first grade we obtained the children's report card marks in reading, written composition, and arithmetic. These marks ranged on a 12 point scale from D- to A+ and reflect the teacher's appraisals of the children's command of the core curriculum established by the board of education. To determine each child's overall in-class performance at the end of first grade we calculated an average mark for each child across these three subject areas.

Because of the possibility that some of the first grade teachers who prepared these report cards might have been informed by the children's preschool teachers of the children's scores on the TSRI, it was considered useful to employ a second measure of achievement. Thus, in May of first grade we administered grade appropriate tests from both the Woodcock Reading Mastery Test (WRMT) by Woodcock (1974, Form-B) and the Keymath Diagnostic Arithmetic Test (KDAT) by Connolly, Nachtman, and Pritchett (1971) to approximately 85% of the children in each sample. These particular instruments were chosen because they contain material actually taught in class and so permitted a further appraisal of the children's command of the core curriculum.

Moreover, since the first grade teachers had no knowledge of the children's scores on either instrument and the testers who administered these instruments were not aware of the preschool teacher's assessements on the TSRI or of the children's progress in class, we could be quite certain that, here, the predictor and criteria were indeed independent.

Results

Table 1 contains the product-moment correlations between the children's total scores on the TSRI obtained in pre-kindergarten (Sample #1 and #2) as well as in kindergarten (Sample #3 and #4) and the children's subsequent performance in first grade.[1] (Although separate correlations were calculated for the males and females in each sample, no reliable sex differences were found and so this evidence is not reported.) As the results in this table indicate, independent of when the TSRI was administered, the sample of children to whom it was given, or the achievement measures used, the outcome was the same. For example, when in-class performance was the criterion the correlations ranged from .47 (Sample #2: first grade marks in math, $df = 66$, $p < .001$) to .64 (Sample #4: overall first grade performance, $df = 225$,

$p < .001$). When the criterion was achievement test performance the correlations extended from .52 (Sample #1: KDAT, $df = 31$, $p < .001$) through .65 (Sample #3: KDAT, $df = 83$, $p < .001$). Furthermore, the correlations in Table 1 are very similar to the correlations reported by others using such psychometric screening devices as the McCarthy Scales of Children's Abilities (Funk, Sterner, & Green, 1986), the de Hirsch Predictive Index (Feshback, Adelman, & Fuller, 1974), and the Metropolitan Readiness Test (Serwer, Shapiro, & Shapiro, 1972,) to mention but a few (for reviews of the correlational validity of many psychometric screening instruments see Dykstra (1967) or Horn and Packard (1985)).

In summary, this evidence suggests that the scores children receive on the TSRI, whether in the spring of pre-kindergarten or in the spring of kindergarten, are related to children's performance across the curriculum at the end of first grade. Furthermore, the correlations are comparable in magnitude to those obtained using the far more time consuming instruments that frequently have been recommended for general screening purposes.

Place Table 1 about here

In addition to knowing its correlational validity, it is equally important to determine if a screening device can be employed to separate preschool children whose subsequent school

achievement is well below average from other preschool children whose performance in school is considered acceptable. As a basis for making such a judgement, the cutoff points typically recommended for use on standardized tests like the ones mentioned above, usually identify about 70% to 75% of children who later show serious learning problems (true positives). Moreover, with these cutoff points it is often possible to achieve overall classification hit rates (true positives + true negatives/total sample) in the vicinity of 80% (Mercer, Algozzine, & Trifiletti, 1979). Therefore, if the TSRI is to be employed by preschool teachers for general screening purposes in place of standarized psychometric tests administered by psychometrists or psychologists, it would seem necessary that the TSRI should achieve at least this standard of performance.

First, employing Lindsay's general procedure (Lindsay & Wedell, 1982) we selected as a cutoff point on the TSRI a total score equivalent to one standard deviation below the mean. This procedure resulted in a cutoff score of 11 at the pre-kindergarten level while at the kindergarten level the resulting cutoff score was 13. Children whose scores on the TSRI placed them either at or below these values were said to be at risk for failure, or in other words, to have a poor prognosis for school success. Children scoring above these points, on the other hand,

were not expected to have difficulty in school and therefore were said to have a good prognosis for school success.

Next, following guidelines in Lichtenstein and Ireton (1984), the children in all four samples were divided into three categories based on the children's overall performance in class at the end of first grade. Children whom we placed in the "poor performance" category were those who received an overall grade of D-, D, or D+ on the 12 point scale mentioned above. For the most part these children either were not promoted or, if promoted, were assigned by their teachers to a slower or junior section of the second grade or were placed in some form of special education class because they were experiencing considerable difficulty learning. The second category labelled "satisfactory performance" refers to children whose overall mark was in the C range. Finally, the "good to excellent performance" category contained children having marks in the B- to A+ range which, according to the children's teachers, indicated that the children were not experiencing any major problems mastering the core curriculm.

Place Table 2 and Table 3 about here

Table 2 contains the number and percentage of pre-kindergarten children (Sample #1 and #2) in the three classroom performance categories who were above or below the

cutoff point of 11 on the TSRI. Table 3 contains a similar breakdown but for the kindergarten children (Sample #3 and #4). As the findings in both tables indicate, again the outcome was nearly identical across the four samples. With a cutoff point of 11 it was possible to correctly identify 73% to 90% of the pre-kindergarten children in the poor performance category (true positives) and achieve a mean overall hit rate of 87%. At the kindergarten level, the cutoff point of 13 correctly identified 80% to 85% of the children in this category while the hit rates here ranged from 82% to 87%. It is worth mentioning that although the TSRI scores received by the females were higher than those received by the males in both pre-kindergarten (female: $M = 16.75$, male: $M = 14.36$; $t = 2.81$, $df = 111$, $p < .01$) and in kindergarten (female: $M = 17.81$, male: $M = 16.23$; $t = 3.08$, $df = 337$, $p < .001$), no improvement resulted when we took these differences into account and employed separate cutoff points for males and females. In essence, as was the case with the correlational evidence, when these results are compared to the hit rate findings reported by others (see the extensive literature reviews prepared by Mercer, Algozzine, and Trifiletti, 1979, as well as Lichtenstein and Ireton, 1984), it can be seen that the TSRI is equally or more effective than many of the full-scale psychometric instruments that often are recommended for the purpose of identifying individual at-risk children.

Note also that the findings we obtained through this further analysis of our data represent a decided improvement over the findings reported in the investigations by Fletcher and Satz (1984) and Stevenson, et. al. (1976) referred to above. Recall that in both investigations when preschool teachers were asked to judge the at risk status of children in their classes based solely on their day to day general observations of the children's in-class behaviors, they correctly identified only about 20% of those children who subsequently experienced serious learning problems. In contrast, by having the teachers confine their daily observations to the five items on the TSRI we were able to identify, on average, 82% of these children which is a four fold increase in accuracy over the results reported by Fletcher and Satz as well as Stevenson, et. al..

Ancillary Findings

Because in some school districts teachers might be called upon to identify at-risk children earlier than the spring, it was considered important to know if similar results could be obtained if the TSRI were to be used in the fall semester. To this end we obtained teacher ratings on a further sample of 55 children in November of kindergarten. Two years later, at the end of

first grade, information was collected on the children's performance in school using the sets of criteria mentioned above. In line with our previous findings the correlations here ranged from .53 (WRMT: df = 49, $p < .001$) to .72 (report card marks in reading: df = 53, $p < .001$). Also, the hit rate analysis showed that with the same cutoff point that we employed before at the kindergarten level, we were able to correctly identify 83% of the children whose subsequent classroom work placed them in the poor performance category, while at the same time achieving an overall hit rate of 76%. Therefore, it would seem that the TSRI might very well provide teachers with useful information about the at risk status of a child long before that child even nears the end of a preschool year.

Discussion

The main findings from this investigation support our previous claim (Simner, 1983) that if preschool teachers concentrate only on the five items shown on the TSRI they should have sufficient information to identify the majority of preschool children who are likely to need assistance before entering school[2]. As is the case with all inventories or behavior checklists, however, because the TSRI ratings depend on teacher's subjective judgements it is possible that teachers in districts other than the one where we obtained our data might employ

slightly different standards in arriving at these judgements. If so, these different standards could affect the cutoff points referred to above since these cutoff points were chosen to correspond with scores 1 SD below the mean composite scores obtained from the teachers in our sample. Therefore, in line with a recommendation made by Lichtenstein and Ireton (1984) as well as Salvia and Ysseldyke (1985), we suggest that local cutoff points should be calculated and compared to the cutoff points mentioned above. If there is a discrepency between these local cutoff points and our cutoff points then the local cutoff points should be employed when the TSRI is used elsewhere for screening purposes[3].

Footnotes

[1] The occasional discrepancies in samples sizes shown in Table 1 and in the Subjects section of this report resulted from a few children whose achievement test scores were available but whose report card marks were not because the children moved prior to the end of June.

[2] Some possible reasons for the relationship between certain items on the TSRI and subsequent school achievement are given in Simner, 1982, 1985, 1986. Recommendations for assisting children who perform poorly on these items also can be found in these articles.

[3] A manual to accompany the TSRI has detailed instructions for establishing local cutoff points as well as suggestions for intervention. For information on how to obtain a copy of this manual write to the author in care of the Department of Psychology, University of Western Ontario, London, Ontario N6A 5C2.

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Teacher's School Readiness Inventory

INDIVIDUAL RATING FORM

Name_____ School _____

Grade _____ Date _____ Total Score _____

Instructions: Using the five point rating scale shown below, rate the child on each of the following items. Record your ratings on the appropriate lines in the column to the right. Add all of your ratings to obtain the child's total score.

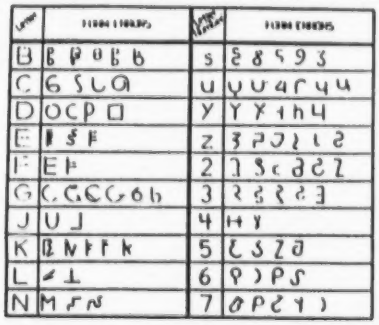
	Ratings
1) In-class distractibility, attention span and memory span: Is the child easily distracted by other children; does the child have difficulty remembering and following instructions and remembering the details and content of material presented in class? Rating: 1 highly distractible; 2; 3; 4; 5 very good attention span	_____
2) Verbal fluency: Does the child tend to use precise words and convey abstract ideas reasonably well when asked to describe events? Rating: 1 poor verbal fluency; 2; 3; 4; 5 very good verbal fluency	_____
3) Interest and participation: Does the child show interest, enthusiasm, and eagerness to participate in various classroom activities and does the child readily convey this overall sense of enthusiasm to other children or to adults? Rating: 1 very unenthusiastic; 2; 3; 4; 5 very enthusiastic	_____
4) Letter identification skills: Approximately how many upper case letters can the child name correctly when shown pictures of these letters one at a time in random order? Rating: 1 0 to 15%; 2 about 25%; 3 about 50%; 4 about 75%; 5 85 to 100%	_____
5) Printing skills: From your observations of the child's printing in class, approximately how often does the child distort the overall form of letters and numbers by adding, deleting, or misaligning parts thereby producing form errors that are similar to (or worse than) the form errors shown below?  Rating: 1 very often; 2 often; 3 occasionally; 4 rarely; 5 never	_____

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Figure 1. The Teacher's School Readiness Inventory.

Table 1. Product-moment correlations between children's total scores on the TSRI obtained in March of either Pre-Kindergarten (Sample #1 and #2) or Kindergarten (Sample #3 and #4) and the children's subsequent performance in First Grade as measured using achievement tests and June report card marks.

		ACHIEVEMENT TESTS		JUNE REPORT CARD MARKS			
		WRMT[1]	KDAT[2]	READING	WRITTEN COMPOSITION	MATH	OVERALL PERFORMANCE
PRE-K.	SAMPLE #1	.53*** (N=33)	.52*** (N=33)	.62*** (N=44)	.53*** (N=44)	.58*** (N=44)	.63*** (N=44)
	SAMPLE #2	.58*** (N=60)	.56*** (N=60)	.59*** (N=68)	.49*** (N=68)	.47*** (N=68)	.59*** (N=68)
KINDER.	SAMPLE #3	.62*** (N=85)	.65*** (N=85)	.58*** (N=107)	.57*** (N=107)	.50*** (N=107)	.61*** (N=107)
	SAMPLE #4	.59*** (N=191)	.57*** (N=189)	.61*** (N=227)	.59*** (N=227)	.58*** (N=227)	.64*** (N=227)

*** $P < .001$

[1] Woodcock Reading Mastery Test

[2] Keymath Diagnostic Arithmetic Test

Table 2. Prediction of children's overall in-class performance at the end of First Grade from TSRI total scores obtained by the children in March of Pre-kindergarten

SAMPLE #1 (N = 44)

	poor performance	satisfactory performance	good-excellent performance
POOR PROGNOSIS (TSRI total score of 11 or less)	(true positive) 9 (90%)	(false positive) 4 (25%)	(false positive) 1 (6%)
GOOD PROGNOSIS (TSRI total score of 12 or more)	(false negative) 1 (10%)	(true negative) 12 (75%)	(true negative) 17 (94%)

$$\text{Hit Rate} = \frac{9 + 12 + 17}{44} = \frac{38}{44} = 86\%$$

SAMPLE #2 (N = 68)

	poor performance	satisfactory performance	good-excellent performance
POOR PROGNOSIS (TSRI total score of 11 or less)	(true positive) 8 (73%)	(false positive) 6 (18%)	(false positive) 0 (0%)
GOOD PROGNOSIS (TSRI total score of 12 or more)	(false negative) 3 (27%)	(true negative) 28 (82%)	(true negative) 23 (100%)

$$\text{Hit Rate} = \frac{8 + 28 + 23}{68} = \frac{59}{68} = 87\%$$

Table 3. Prediction of children's overall in-class performance at the end of First Grade from TSRI total scores obtained by the children in March of Kindergarten

SAMPLE #3 (N = 107)

	poor performance	satisfactory performance	good-excellent performance
POOR PROGNOSIS (TSRI total score of 13 or less)	(true positive)	(false positive)	(false positive)
	17	11	5
	(85%)	(30%)	(10%)
GOOD PROGNOSIS (TSRI total score of 14 or more)	(false negative)	(true negative)	(true negative)
	3	26	45
	(15%)	(70%)	(90%)

$$\text{Hit Rate} = \frac{17 + 26 + 45}{107} = \frac{88}{107} = 82\%$$

SAMPLE #4 (N = 227)

	poor performance	satisfactory performance	good-excellent performance
POOR PROGNOSIS (TSRI total score of 13 or less)	(true positive)	(false positive)	(false positive)
	28	18	5
	(80%)	(19%)	(5%)
GOOD PROGNOSIS (TSRI total score of 14 or more)	(false negative)	(true negative)	(true negative)
	7	76	93
	(20%)	(91%)	(95%)

$$\text{Hit Rate} = \frac{28 + 76 + 93}{227} = 87\%$$